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ABSTRACT

The shortage of qualified mathematics and science teachers is a problem likely to grow in the coming decade, reflecting teacher shortages in other subject specialties. In 1981, almost five times more science and mathematics teachers left to take nonteaching jobs than did teachers in other disciplines. Replacements for these teachers are often inadequately qualified. Since shortages exist in other areas, especially in special education, a need is seen for a comprehensive approach to the problem. An emergency or provisional certificate is an inappropriate response, for while arts and science graduates are well prepared in their own fields, they often lack sound training in teaching methods. The proposals to expand the loan forgiveness provisions of the existing National Direct Student Loan program (NDSL), or to create a new program modeled on NDSL for mathematics and science teachers will be successful long range strategies for recruiting prospective teachers. However, there is an immediate need to establish teacher fellowships for qualified students who agree to a minimum commitment as classroom teachers. States and school districts should be encouraged to provide pilot programs which stress cooperation among schools, universities, and industry. There should be sufficient funding for basic and applied research into mathematics, science, education, and technology as they are translated into programs for elementary and secondary school children. In addition, teachers should be offered sabbaticals and stipends to pursue further training, while business, industry, and institutions of higher education should be given incentives, through tax credits or other means, to provide appropriate learning opportunities for teachers. Support systems are needed to provide assistance to new teachers during their critical first years. (JD)

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ADDRESSING TEACHER SHORTAGES

A TESTIMONY GIVEN TO

THE HOUSE SUBCOMMITTEE ON ELEMENTARY, SECONDARY AND

VOCATIONAL EDUCATION

CHAIRED BY CONGRESSMAN CARL D. PERKINS

AND

THE HOUSE SUBCOMMITTEE ON POSTSECONDARY EDUCATION

CHAIRED BY CONGRESSMAN PAUL SIMON

by

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September 29, 1982

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SP 020 944

Good morning. I am pleased to have the opportunity to testify before this joint hearing of the House Subcommittee on Elementary, Secondary and Vocational Education and the Subcommittee on Postsecondary Education.

My name is Anne Flowers. I am dean of the School of Education at Georgia Southern College in Statesboro, Georgia. I am also President-Elect of the American Association of Colleges for Teacher Education. AACTE is a national professional organization of colleges and universities dedicated to teacher preparation and renewal; collectively our member institutions prepare over 80 percent of all new teachers each year.

I am particulary pleased to have an opportunity to join you today because I know you and your colleagues in the Congress share with me and my colleagues in the education profession a common goal which, to quote Mr. Simon, is to "ensure competence and encourage excellence of teachers."

I have been invited to discuss the nature of shortages of mathematics and science teachers, and, from the perspective of higher education how problems such as this may be addressed. Let me assure you, the shortage of qualified teachers is real, and it is a problem likely to grow during the coming decade.

President Reagan, speaking before a National Academy of Sciences Convocation on Science and Mathematics in the Schools said, "Although there has been increasing discussion in recent months about our ability to train adequate numbers of professional engineers and scientists, we are only now beginning to see serious discussion of the far greater problem of education at the precollege level. This public awareness--and I hope public action--is long overdue...This country was built on American respect for education...Our challenge now is to create a resurgence of that thirst for education that typifies our nation's history." We agree with the President that the time to address the training of adequate numbers of education professionals is long overdue.

Between 1971 and 1980 the annual number of new teacher graduates decreased from 314,000 to 159,000. In large measure this decline was brought on by students' enrollment in other fields of study in response to teacher surplus in the early 1970s. The trend continues. Last fall the percentage of high school seniors indicating an interest in teaching fell to only 2.2 percent of men and 7.4 percent of women, a decline of 50% since 1973. In 1981 43 states reported a shortage of qualified mathematics teachers and between 1970 and 1980 there was a 77 percent decline nationwide in the number of secondary school mathematics and science teachers being trained. This is compounded by the fact that only 600, or 40 percent of the nation's teacher preparation institutions currently graduate math teachers and only 55 percent of these graduates actually enter the profession.

In my own state of Georgia, only 70 prospective mathematics teachers were graduated from our colleges and universities during the

1981-1982 school year. Of these only 60 percent of them actually entered the classroom, and the drop-out rate for the first year was 35 percent with a projected loss of 10 percent per annum for future years. To supplement this number, Georgia actively recruits from other states. Many of our new teachers come to Georgia from the midwest, Michigan, Indiana, Illinois, and Minnesota. This year we will have the mathematics and science teachers we need, but at the expense of some of our neighbors to the North.

Attrition among practicing teachers aggravates the shortage. In 1981 almost five times more science and mathematics teachers left to take non-teaching jobs than teachers in other disciplines. Further, we are facing a "graying" of our teaching force which is especially acute in scientific and technical areas to the point that the average age of science teachers is 41. The replacements for these trained teachers are often inadequately prepared. Of the teachers newly employed in 1981-82 to teach high school mathematics or science, 50 percent were formally unqualified and are teaching with emergency certificates.

SHORTAGES IN OTHER SUBJECTS

An undersupply of mathematics and science teachers is part of an overall shortage. Georgia was able to find enough individuals to fill our vacancies for the opening of school this September. But what about next year? Where will the replacements come from for the anticipated 35% of these teachers who will leave the classroom? Of even more immediate concern, how are we to address undersupply in areas other than mathematics and science? The latest vacancy survey for teaching positions in Georgia, completed just last week, indicated shortages in the following areas:

Speech pathology
Physical Therapy
Integrated Special Education
Behavior Disorders
Learning Disabilities
Early Childhood (k-4)
Industrial Arts

According to a recent survey of teacher supply and demand by field and region conducted by the Association of School, College and University Staffing, Georgia's shortages are not unique. In addition to the areas just mentioned, a number of other teaching fields have national shortages of qualified personnel:

Vocational Agriculture
Bilingual Education
Special Education (emotionally disturbed)
Special Education (multi. Handicapped)
Special Education (MR)
Special Education (gifted)
Special Education (reading)
Business
Data Processing

Clearly solutions limited to one discipline won't be much consolation to school districts in Illinois, and Kentucky who can't find teachers for their vocational agriculture program; or for their gifted and talented program; or for their handicapped children. In addition, teachers prepared and hired in the 1950's in response to the severe shortage at that time are now within 10 years of retirement. It takes four to six years to train a teacher for initial entry into the classroom. I suggest that now is the time to begin to prepare for the replacement of these individuals.

THE NEED FOR A COMPREHENSIVE APPROACH

A number of solutions have been proposed for the mathematics and science teacher shortage...many are excellent, but none should be considered as an exclusive remedy. Several of the proposals put forward by the Congress or educational policy makers will address the teacher shortage issue in the long run while others may have more immediate impact. Both need to be reviewed and considered within the larger context of ensuring competence and excellence of teachers.

We would hope that Congress would address the need for a comprehensive personnel development policy which would ensure the preparation of sufficient numbers of qualified teachers to meet current and future demand. To address recruitment into the profession, the quality of preparation, the nature of the classroom setting in which we place these teachers, the necessary support services for them, and teacher retention.

The conditions of practice significantly affect our ability to recruit and retain sufficient numbers of qualified teachers. We have high expectations of our teachers: superb academic preparation from the schools of arts and sciences, strong professional preparation and sufficient supervised experiences in the classroom, and expertise in the latest in science and technology. Yet we supply out-of-date equipment and materials and pay them far less than others with similar background and education. Why are we suprised when these people choose not to remain in the classroom?

I would caution you to beware of simplistic solutions which address only a small component of the problem or themselves create greater problems.

Certification waivers are one such issue. An emergency or provisional certificate is an inappropriate response to the shortage problem. Knowledge of subject matter is not sufficient preparation for the teaching of it. How can we have both a commitment to educational excellence and tolerate untrained teachers in our schools? Bright, caring, intelligent arts and science graduates <u>are</u> abundant, but are they qualified? We must ask ourselves...

Do they know about sequencing of content or curriculum development?

Do they know anything about test construction or the interpretation of standardized tests?

Do they know anything about learning theory or understand how to manage a class of 30 unique and different individuals?

Do they know about diagnosing various handicapping conditions or developing appropriate educational programs?

Do they know anything about the laws that shape our educational programs?

Do they have a repertory of teaching or instructional strategies to use in various situations and with different children?

LONG RANGE STRATEGIES

One of the "long range" strategies receiving considerable attention is the proposal to expand the loan forgiveness provisions of the existing National Direct Student Loan program or to create a new program modeled on NDSL for mathematics and science teachers.

We applaud the efforts of Senators Glenn, Pell and Congressman McCurdy and others who appreciate that the NDSL program is a successful strategy for recruiting persons into teaching. It is, however, a long range strategy. Under such a program it will be three to five years before the first group of students finish their preparation and enter the classroom. In fairness to the children now in elementary and secondary schools, I do not feel we can wait an additional five years for those needed teachers until this program comes to fruition. In addition, expanding the provisions of NDSL for mathematics and science teachers does nothing to address current and future shortages in other areas. Recognizing that the Higher Education Act which authorizes the NDSL program will not be considered again by the Congress for at least a year, we would like to encourage the immediate establishment of a program of teacher fellowships to be made available to qualified students who agree to a minimum commitment as a classroom teacher. Such a program could be implemented through a system of matching grants to the States. These grants would be awarded by the Governor as fellowships to qualified undergraduate students seeking careers in teaching. These awards would allow the Governors to target specific shortage areas. Federal support for this initiative will assist those States where current economic conditions prevent the implementation of such a program without external support.

We believe that the Congress must exercise its authority to assess current and future supply and demand needs for teachers. States and school districts should be encouraged to provide inservice training that meets the highest academic and professional standards. Pilot programs which stress school-university-industry cooperation should be identified and supported. There should be sufficient funding for

basic and applied research into mathematics, science, education and technology as they are translated into programs for elementary and secondary school children. Teachers should be offered sabaticals and stipends to pursue additional training while business, industry, institutions of higher education and other such organizations should be given incentives, through tax credits or other means, to provide appropriate learning opportunities.

SHORT TERM SOLUTIONS

Elementary or Secondary school children who returned to school in September to learn they wouldn't have science class because no teachers were available can't wait for long term solutions. In response, a number of states have devised programs which attempt to solve their own shortage problems in that state or locality. Georgia's active recruitment of mathematics and science teachers exacerbates the problem in Minnesota, Mighigan, Indiana, Ohio, Illinois and elsewhere.

Rather than recruting and employing unqualified persons, we must direct our efforts to keeping those trained individuals who are in, or about to enter teaching, and to reattracting those teachers who have left the profession for positions in business and industry.

1. We must begin by making the general public and particularly parents aware of the cost apathy. We must publicize the economic and social costs inherent in an educational system which cannot adequately prepare its children for the present and future technologies. And, we must direct special attention to our elementary schools where young boys and girls develop many of their attitudes toward science, mathematics and technology. These subjects, like foreign language instruction, when introduced early and properly are neither difficult nor frightening.

2. We need incentives for the mathematics and science teachers who will be graduating from our colleges and universities <u>this</u> year to enter the classroom. They are a precious resource and we can't afford to have half of them enter professions other than teaching. Business and industry partnerships, such as the tax credits suggested by Mr. McCurdy, are one option. Another would be to assist school districts and institutions of higher education in establishing support systems so these new teachers will have the academic and professional assistance they need during their critical first years. Enabling university faculty, peers and system supervisors to assist the beginning teacher while having a reduced teaching-load would be a way to implement this network.

3. Of immediate concern must be inservicing existing mathematics and science teachers to keep them in the profession. Programs that address both their academic needs and their professional needs are essential. We believe that states should be given incentives to conduct programs with school districts and IHEs to deliver this

needed inservice. We encourage you to consider the former National Science Foundation model of summer institutes for elementary and secondary school teachers as a viable and much needed program to upgrade the skills of teachers in the classroom. At the same time the institutes could retrain surplus teachers in one area to fill positions in high demand areas. Through such institutes our colleagues in the colleges of science will have an opportunity to prepare students in subject matter such as mathematics, chemistry, computer technology or other disciplines. Teacher educators will help these students understand how they can translate their scientific or technical knowledge into programs which will generate excitement and an interest in a fourth grade general science class.

The college of education, serving as a coordination point, can work with faculty in the colleges of arts and science to translate the resources of the university into needs of school systems and teachers.

4. Even the best teacher cannot serve the needs of his or her students with out adquate and up-to-date materials. We believe the Congress should consider proposals to provide incentives to businesses for sharing high technology equipment with elementary and secondary schools. We stress, however, the provisions of such a bill should also be extended to the teacher training institutions so we can prepare our graduates or those who have come to us for inservice in state-of-the art technology.

State-by-state solutions should complement, not replace, the federal response to what is a national problem demanding national attention and a national solution. It is time for a comprehensive look at all of the factors surrounding teacher recruitment, training, placement and retention. Quick fixes to the crisis of the moment won't work. This is not an easy task, nor will it be without cost. As long as we spend less to train a teacher than we spend to educate a third grader, we can't expect to have the kind of quality personnel in our classroom that these children deserve. I ask that the Congress make a commitment to the children, schools and teachers, both present and future, to develop a comprehensive policy which will touch all points in a teacher's development and to make this commitment your highest priority for this Congress and the next.